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teen years has been, such as to demand two full years' study, and in recent years has included two books of the *Iliad*. It is particularly unfortunate that by such an error any recognition should be withheld from an institution which, at the risk of considerable disadvantage, has persisted in defending the highest standards.

Benj. Ide Wheeler.

Ithaca, April 3, 1893.

"BIOLOGY IN SECONDARY SCHOOLS."

Editor School Review :

SIR—The article on *Biology in Secondary Schools*, by President Coulter, which appeared in the March number of the REVIEW, suggests some questions and criticisms. First, as to minor points : Why should the term natural history be abandoned as synonymous with biology ? It has always included mineralogy and geology. Under what stretching of the term can these fall under biology ? Why is the current use of biology a misapplication ? Everyone knows that it means human physiology, and I take it that all subjects still have some relation to the human element as the most important in the scheme of education. Is it not trivial to object to a use which no one misunderstands ? I fear our professional scientists are more concerned over the inaccuracies of others than of their own, as the botanists' frequent misuse of the words grain, corn, and honey—to take very homely illustrations—shows.

Secondly, what injustice is done to children by teaching them to think that botany is the study of flowers ? Children do not—nay, cannot—study botany at all ; they merely learn elementary facts about plants, which pave the way for botany later on, and my experience has been that flowers still serve as the best introduction to the subject for them.

Dr. Coulter further mistakes, when he says that "a buttercup is . . . not so fit a subject for elementary study," as "a moss, or a toadstool, or a seaweed." There is a psychological principle followed in teaching, which says, proceed from the known to the unknown. The greater the step from one to the other, the greater the difficulty of taking it. Now, when one uses the word "plant", the average individual (perhaps the average botanist) immediately thinks of an object with root, stem, and green leaves, rather than of mycelium or thallus and conceptacles. So the child, and hence the step from the conventional plant to the specialized buttercup is easier than from the former to the toadstool, moss, or seaweed. To be sure, the child does not *understand* the buttercup. Is Dr. Coulter willing to say that *he* does ?

Thirdly, in the excellent suggestions made as to conducting the work, the writer says that sketching an object "secures close observation". Teachers of drawing can enlighten him on this point. It has been my experience that pupils can draw and redraw an object and still not see it. A little too much has been expected from drawing in this regard.

The writer in question further says: "A careful study of typical plants should be made." This statement has been made so often that it begins to arouse a feeling of inexpressible weariness. Typical of what? Sir Richard Owen made some very pertinent remarks about typical and type specimens many years ago, which, though written concerning animals, will apply to plants.

Lastly, I desire to take issue on the statement "It is much more satisfactory and scientific to begin with the study of the simplest forms . . . because they are far easier to understand." They may be to Dr. Coulter; to the average high school pupil they are not. Professor Huxley was of this opinion some years ago but has altered it and stated his excellent reasons therefor in the revised edition of his *Practical Biology*, with a brief extract from which I have done.

"After two or three years' trial of the road from the simple to the complex, I became so thoroughly convinced that the way from the known to the unknown was easier for students, that I reversed my course, and began with such animals as a Rabbit or a Frog, about which everybody knows something."

I leave to President Coulter the pleasing task of showing that Professor Huxley is in error.

Respectfully,

F. W. Staebner.

Westfield, Mass., April 8, 1893.